

Crude Oil Fractionation Facilities to process 25,000 BSPD of light crude (API 38.2° or API 45.8°)

BE DE USA

Project scope included the design of new Crude Fractionation facilities to process 25,000 BSPD of light crude (API 38.2° or API 45.8). The facilities handle single crude streams or a combination of these two feed stocks mixed at any ratio.

Fractionation facilities consisted of an Atmospheric Distillation Unit (ADU) designed to process 25,000 BSPD and to provide products run to storage facilities along with the utilities required to support the proper and safe operation of the process systems.

EXECUTIVE SUMMARY

THE CLIENT

BASIC Equipment has been established as a manufacturing company in North America for A.S.M.E. Pressure Vessel Fabrication and Repair, A.P.I. 4F Mast and Substructure Design and Fabrication, Natural Gas Compression Design and Fabrication, and general A.W.S. Structural Welding.

PETROMAX Refining Company LLC was founded in 2002. The Company operates as a chemical trading company, its operations include buying and selling chemicals, feed stocks, fuels, and other petroleum products. Petromax is based out of the Gulf Coast region of the United States.

CHALLENGES

SOLUTIONS

Main Achievements

Basic Engineering phase was executed in nine (9) weeks including the process endorsement from the conceptual design, HAZOP, plot plan definition, preliminary piping modelling (3D model) and complete design and specification of the Long Lead Items (LLIs)

Detail engineering phase, was executed in ten (10) months, however due to the concurrent scheme implemented, it was possible to complete the engineering design for specific areas, in six (6) months allowing the early start of fabrication at shop. Documents and drawings were prepared based on construction priorities and defined sequence for equipment installation.

Skids / modularization scheme allowed optimizing the required plot area about 20% to fit into the available space, minimizing interconnecting equipment piping and optimizing the project construction plan in about three (3) months through the implementation of the multi offices scheme with a common database and a focal point for technical coordination.

Early design reviews with client's representatives participation improved the efficiency, generating at the end a more robust design with minimum changes during the fabrication stage. Compliance with local and international regulations as well as with specific client's requirements were discussed and solved during those design reviews with client and third parties involved before releasing the documents and drawings to construction.

Technical quality of technical documents and drawings released to construction allowed minimum revisions during construction.

The most critical aspects that required special attention during the project execution were the available plot area for the facilities installation, tightened construction schedule on the project master plan, mainly dependent on the LLIs delivery at site, and the implementation of a multi office team work.

Plot Area:

The available plot area for the plant facilities was very limited. For the process areas (ISBL) the available footprint area was about 33,000 ft² and 17,000 ft² for OSBL areas under VEPICA's responsibility.

Project Schedule:

Project schedule was a critical factor as well, which implied the definition of a project master plan aimed to construction optimization and the simultaneous fabrication at shop as requested by our client.

Multi office team work

Implementing the concurrent engineering scheme, and the multi-site offices team work generated additional challenges to keep the project integrated, standardized and focused on the project goals.

The main derived challenge to cope with project milestones was the compliance with local and international industry safety requirements, as well as special safety considerations from BASIC EQUIPMENT when working in offices located on different countries with different regulations; in most of the cases design and safety international regulations were similar for all the working centers involved; only adaptations to local regulations were an issue during the project execution, and they were addressed during the multi-disciplinary design reviews with client and other contractors at the early stage of the project to avoid reworks. HAZOP and Process design review performed as contractual requirement from HFOTCO involving third parties specialists allowed guaranteeing the compliance of local applicable regulations.

In an effort to reduce construction timeframe and to minimize equipment footprint impact, Vepica came up with an aggressive modularization design, allowing an important reduction in the construction schedule which translated also in earlier revenues for our final Client Petromax. It was also implemented a concurrent engineering execution scheme rather than sequential execution, allowing doing several tasks at the same time and thus optimizing the engineering design cycle. In this way the design engineering, procurement and construction were integrated to reduce the elapsed time required to complete the project in a more traditional sequential scheme.

The Multisite execution philosophy that Vepica implemented, allowed us to work in three different offices sharing a common 3D Model at the same time, all located in two time-zones one hour apart. Our Engineering team developed some databases interfaces to boost the advantage of the 3D Software used, focussed in deliver reliable engineering products to construction. This develop was later awarded by Intergraph during 2016.